

ENVIRONMENTAL ASSESSMENT

PROPOSED MAINTENANCE DREDGING OF  
NORTH COVE, OLD SAYBROOK, CONNECTICUT AND  
BROCKWAY BAR AND ESSEX SHOAL, CONNECTICUT RIVER  
STATE OF CONNECTICUT

Prepared by  
New England Division  
U.S. Army Corps of Engineers  
Waltham, Massachusetts

May 1976

## SUMMARY SHEET

1. Name of Action: (X) Administrative ( ) Legislative

2. Description of Action:

The subject action is to conduct maintenance dredging at North Cove, Old Saybrook, Connecticut, and at Brockway Bar and Essex Shoal in the mainstem of the Connecticut River. The project calls for dredging of 110,000 cubic yards from North Cove, 23,000 cubic yards from Brockway Bar, and 20,000 cubic yards from Essex Shoal. Disposal of dredged material will be accomplished by point dumping in Long Island Sound approximately 1/2 mile southwest of the charted Cornfield Shoal disposal area.

3. Environmental Impacts:

Potential environmental impacts associated with the proposed action include both short term and long term effects. Short term effects are mainly associated with physical, chemical and biological impacts at both the dredge and disposal sites. These include (1) loss and disruption of benthic communities, (2) temporary release of suspended solids, nutrients, and chemicals in the water column, and (3) temporary losses in water quality and aesthetic value of the water column. Longer term impacts are related mainly to continued use of water resources for economic and recreational purposes. They include (1) maintenance of recreational boating in North Cove and surrounding areas, and (2) maintenance of navigation in the Connecticut River

with the advantages of waterborne transportation. Long term impacts to the natural environment will result from future periodic maintenance of the project areas.

#### 4. Alternatives:

Four land sites in the Old Saybrook area were considered as potential disposal sites for the dredged material from North Cove. All four sites were found to be deficient, and therefore were not considered feasible alternatives. No land sites were available for disposal of dredged material from Brockway Bar or Essex Shoal. In addition, several open water disposal areas were considered and found to be less desirable than the site finally selected.

## 1.0 PROJECT DESCRIPTION

### 1.1 Purpose

The proposed project will alleviate existing shoaling at North Cove in Old Saybrook, Connecticut and Brockway Bar and Essex Shoal in the Connecticut River below Hartford.

### 1.2 Background

There have been many reports dating back to 1837 on the Connecticut River relative to improvement for commercial navigation. In general, these reports have covered improvements at particular localities or bars in the river such as anchorages and access channels, and improvements for commercial navigation to Hartford, including channels, dikes, training walls and revetments. The existing project consists of two riprap stone jetties at the mouth of the river, the tops being 5 feet above mean high water and 6 feet wide, being 2,300 and 2,750 feet long, east and west respectively (River and Harbor Act of 10 June 1872); a training dike about 3,700 feet long at Hartford (River and Harbor Act of 3 March 1881); a channel 8 feet deep, 75 feet wide and 1.5 miles long in Eight Mile River, from the Connecticut River to Hamburg, with an 8-foot turning basin 150 feet wide and 300 feet long (River and Harbor Act 25 June 1910); a channel 15 feet deep and 300 feet wide from Long Island Sound to Lyme Railroad Bridge about 3.4 miles (River and Harbor 27 February 1911), thence 15 feet deep and 150 feet wide to Hartford, about 48.6 miles.

(River and Harbor Act 30 August 1935), resulting in a total distance of 52 miles; the construction of training walls, dikes, revetments and accessory works from the mouth to Hartford (River and Harbor Act 2 March 1919); anchorages 11 feet deep about 11 acres, and 6 feet deep about 17 acres in North Cove, Old Saybrook, with an entrance channel 11 feet deep and 100 feet wide (River and Harbor Act 2 March 1945); Essex Cove Channel, 10 feet deep, 100 feet wide and about 4400 feet long adjacent to the Essex waterfront, with a 10 foot deep anchorage about 15 acres bounded by 10 and 15 foot channels, and an anchorage of about 19 acres 8 feet deep bounded by the same 10 and 15 foot channels, (River and Harbor Act 14 July 1960, Section 107); and a 6 foot channel into Wethersfield Cove 60 feet wide leading to a 6 foot anchorage of about 30 acres (River and Harbor Act 14 July 1960, Section 107).

The foregoing depths refer to mean low water. Mean tidal range is 3.5 feet at mouth and about one foot at Hartford. Total actual Federal costs for construction and maintenance of the Connecticut River navigation project from its mouth to Hartford is approximately \$7,200,000 through Fiscal Year 1976.

### 1.3 North Cove

North Cove is located in Old Saybrook, Connecticut about 14 miles west of New London near the mouth of the Connecticut River. It consists of a small embayment covering about 150 acres (Figure 1),

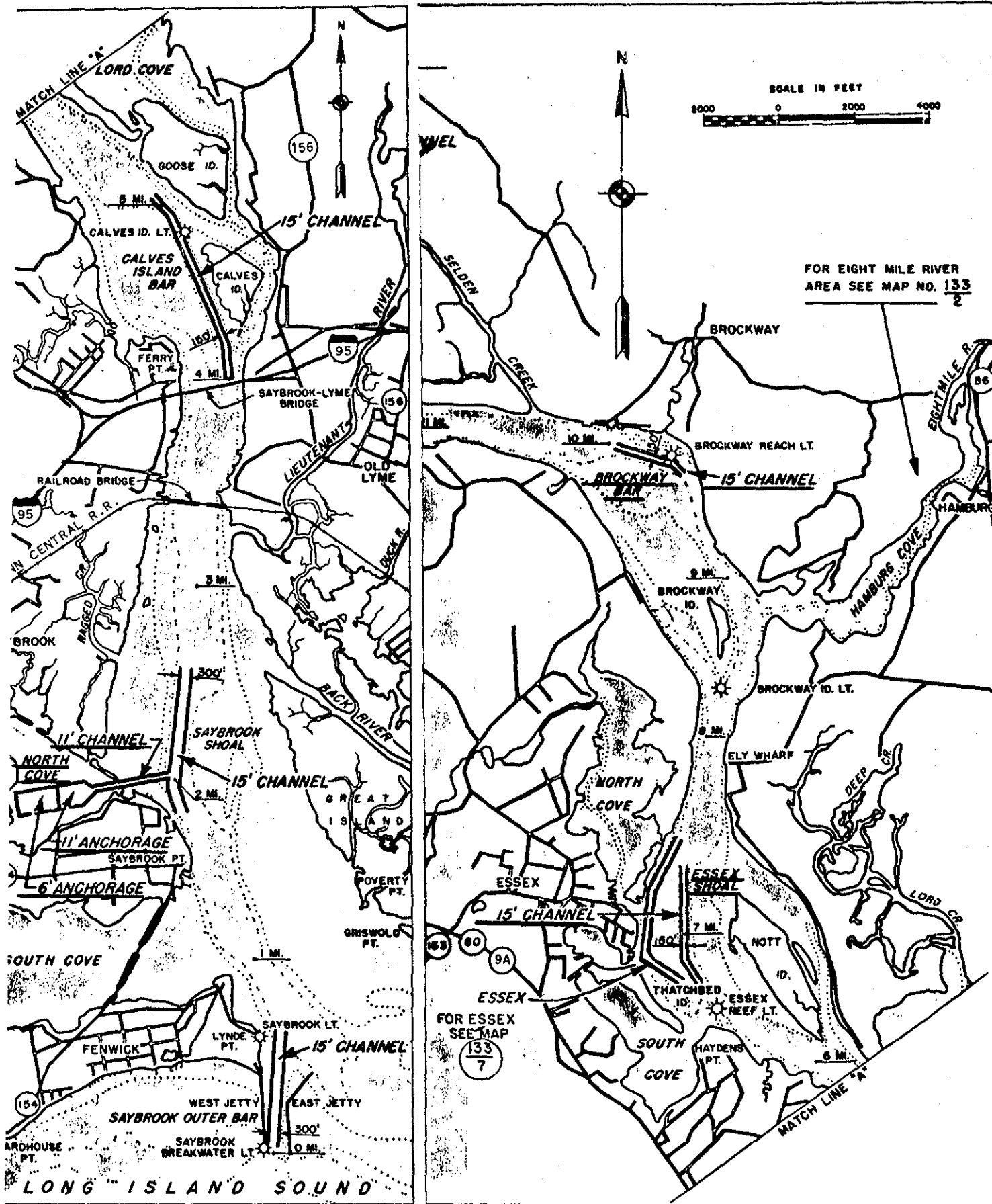


FIGURE 1



and is almost completely isolated from the Connecticut River by an abandoned railroad embankment approximately 3,000 feet long. Except for the embankment, North Cove is bordered primarily by tidal marsh.

The authorized Federal project in North Cove consists of an entrance channel 1,900 feet long, 100 feet wide and 11 feet deep leading to an anchorage area of the same depth about 800 feet long by 650 feet wide covering about 11 acres. Beyond this anchorage is a second anchorage, six feet deep, 1,150 feet long, and 650 feet wide, covering about 17 acres and extending nearly to the west shore of the Cove.

North Cove was initially dredged in 1965 at which time the authorized dimensions were provided. Project construction involved removing approximately 535,000 cubic yards of material, primarily sand, which was placed in the Cornfield Shoal disposal area in Long Island Sound. Shoaling since 1965 has reduced available depths in North Cove to the extent that vessels cannot safely navigate at all stages of tide. The proposed maintenance will consist of removing and disposing of approximately 110,000 cubic yards of material to restore the project to a useful and accessible condition. Hydrographic surveys have shown controlling depths to be as follows: 11-foot entrance channel-4.2 feet; 11-foot anchorage-4.5 feet; 6-foot anchorage-5.2 feet. Under the proposed dredging project, the 11-foot channel and 11-foot anchorage area will be dredged to a depth of eight feet and the six-foot anchorage will be dredged to six feet. Although not



entirely to authorized depths, the proposed depths will meet the needs of vessels currently utilizing the project.

#### 1.4 Connecticut River Below Hartford

Brockway Bar and Essex Shoal are upstream from North Cove and in the mainstem of the Connecticut River. Brockway Bar is approximately at river mile 10 and Essex Shoal is approximately at river mile 7. (See Figure 2). Both of these river bar channels have authorized dimensions of 15 feet deep at mean low water and 150 feet wide.

Dredging of the various bar channels in the Connecticut River main channel, including Brockway Bar and Essex Shoal, has been performed since the 1930's. This irregularity of dredging is due to inconsistencies in the cause of shoaling, which is primarily suspended materials carried down the river during spring freshets. A maintenance dredging contract is generally awarded bi-annually to restore the most seriously shoaled channels to authorized dimensions. Tankers and towboats having drafts of 12 feet require full project depth of 15 feet, mean low water, to travel the 52 miles from Long Island Sound to Hartford without encountering costly tidal delays and potential hazards. Vessels drawing more than 12 feet face tidal delays since they require greater than project depth to allow for a buffer between the bottom of the vessel and the channel bottom; these delays, and the resulting costs, are minimized if project depths are available.

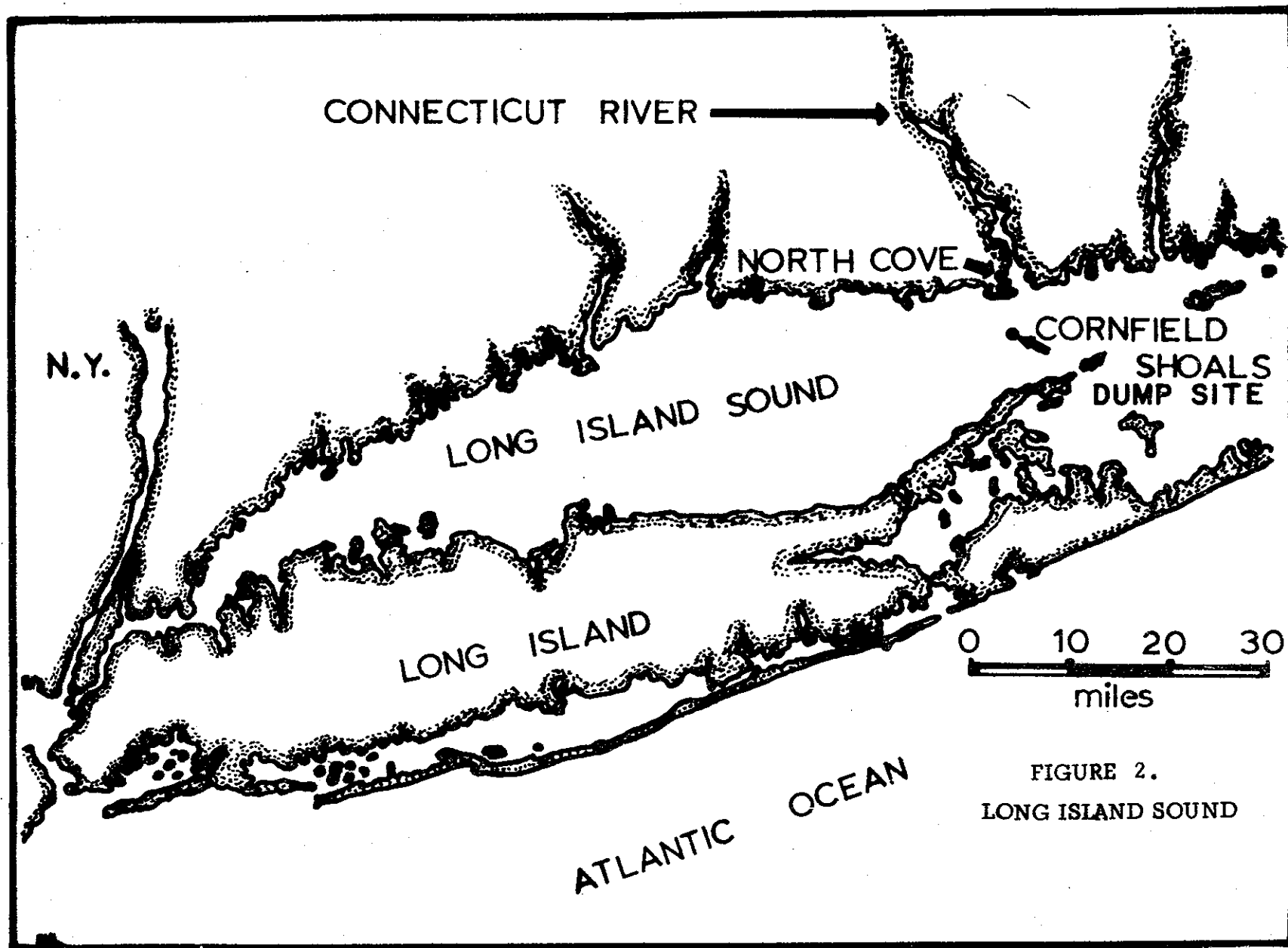


FIGURE 2.  
LONG ISLAND SOUND

Dredging is proposed at Brockway Bar and Essex Shoal to restore these portions of the Federal channel to authorized dimensions. Depths of 12.5 feet (Brockway Bar) and 13.2 feet (Essex Shoal) are now creating delays and potential hazards for shipping in the river. The proposed work will involve the removal of approximately 23,000 cubic yards of material at Brockway Bar and 20,000 cubic yards at Essex Shoal.

#### 1.5 Order of Dredging and Disposal

The proposed project calls for performing dredging and disposal of North Cove sediment starting in September 1976. When all work at North Cove has been completed, dredging and disposal of material at Brockway Bar and Essex Shoal will be performed. This order of work has been selected to allow "capping" the organic silt from North Cove with coarser-grained granular material from the Connecticut River bar channels. This approach is in conformity with recommendations made by the National Marine Fisheries Service.

#### 1.6 Disposal Area

It is proposed that the 153,000 cubic yards of material from North Cove, Brockway Bar and Essex Shoal be hauled in scows and dumped at an open water disposal area which is an extension of the existing Cornfield Shoal Dumping Grounds in Long Island Sound. This area is one nautical mile square (with sides running true north-south and east-west) the center of which is 5,930 yards from Saybrook

Breakwater Light on a true bearing of  $198^{\circ} 15'$ . Point dumping will be employed in disposal operations with the point located at  $41^{\circ} 12.6' N$ ,  $72^{\circ} 21.6' W$ ; or 6,650 yards from Saybrook Breakwater Light on a true bearing of  $194^{\circ}$  from the Light. The point is over a natural depression that is approximately 170 feet deep.

#### 1.7 Relationships With Other Projects

The proposed project includes coordination of dredging activities at North Cove, Brockway Bar and Essex Shoal. In addition, disposal of material dredged from these sites has been considered in relation to proposed and projected dredging and disposal from other sites. Details are furnished in Section 4.4.

Other relationships center on legislation covering environmental conservation and protection. The proposed project is coordinated with the specifics of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500; 86 Stat. 816), the Marine Protection, Research and Sanctuaries Act of 1972 (Public Law 92-532; 86 Stat. 1052), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Finally, this project is coordinated with appropriate Federal, State and local agencies. Additional details are available in Section 9.0 of this report.

## 2.0 ENVIRONMENTAL SETTING WITHOUT THE PROJECT

### 2.1 Connecticut River

The Connecticut River, the largest river in New England, begins in the northern portion of New Hampshire and flows south to Long Island Sound, a distance of approximately 409 miles. At Old Saybrook, Connecticut, the river enters the Sound, and is the most conspicuous indentation of the shoreline. Tidal effects reach upstream to Hartford, Connecticut, a distance of 52 miles.

The Connecticut River from Hurd State Park in East Hampton to the river mouth (shellfish closure line) was classified as Class SC by the Connecticut Department of Environmental Protection (Conn. DEP) in 1973. Water quality conditions in 1976 are expected to be Class SB. Present conditions are considered suitable for fish, shellfish and wildlife habitat; for recreational boating and industrial cooling; and for good aesthetic quality.

The Connecticut River provides suitable habitat for aquatic wildlife, including various finfish species. In recent years cooperative efforts between State and Federal agencies have included the restoration of anadromous fish in the river.

Bordering the Connecticut River between Long Island Sound and Hartford are 17 cities and towns having an estimated population of 500,000; however, the population that is served by the existing commercial navigation channel to Hartford is estimated at 1.3 million. The area bordering the river is a rich farming and industrial

region, and the cities of Hartford and Middletown are large industrial centers manufacturing a wide variety of projects.

The principal terminal and transfer facilities are located at Middletown, Portland, Wethersfield, East Hartford and Hartford. The power company terminals at Middletown and Hartford have been modernized to provide for storage of oil as a fuel for power production replacing the former coal handling and storage facilities. There are seven yacht clubs and seven boat clubs located along the river between the mouth and Hartford; 12 boatyards and 34 marinas provide service for boats ranging from small skiffs to large yachts.

Waterborne commerce on the Connecticut River to Hartford increased 42% during the period 1960-1974, from 2,556,308 to 3,633,458 tons. This commerce consisted primarily of petroleum and petroleum by-products shipped from New York and other nearby ports. Ferry service on the river below Hartford carried 343,317 passengers in 1974, with an additional 108,934 automobiles accompanying passengers.

During 1974, a total of 58,377 commercial vessel trips were reported having a maximum draft of 18 feet. Approximately 2/3 of the total commerce is transported on vessels and barges having drafts greater than 12 feet. Although nearly one third of the vessels used to deliver petroleum products are small coastwise tankers which navigate on flood tide to pass over shoaled areas in the existing channel, these tankers are being phased out in

favor of barges of 4,000 ton capacity drawing 14 feet. Barges are a more economical means of transporting oil to meet the needs of terminals scattered along the river because the towboats are able to leave the barges for loading and unloading, thus eliminating the cost of in-port time incurred by the tankers.

Failure to maintain the Connecticut River navigation channel to Hartford will have a severe economic effect on the region being serviced by waterborne traffic. In addition, the potential will increase groundings and collisions with the possibility of oil spills. Alternatives will be to transport oil by various modes of transportation--railroad tank cars, pipelines or trucks. The use of railroad tank cars from the point of origin or from intermediate retailing points will require the purchase of numerous new tank cars, the acquisition of new lands, if available, and the development of sidings on the transportation route. Also, more hired help would be necessary to handle the increased workload, and intermediate delivery points would entail more storage and rehandling facilities resulting in higher costs. Many oil company storage tanks in the East Hartford area are located far from rail facilities thus negating direct transfer. Therefore, either rehandling by truck or pipeline would be required from freight yards, or existing storage facilities would have to be relocated.

Direct delivery by truck from refineries or intermediate rehandling points would be even more costly due to the much smaller quantities which could be delivered per trip. The use of pipelines

would entail initial construction of such lines to existing facilities. One problem to be encountered would be the requirement for steam-jacketed pipelines to permit pumping of high viscosity residual oil during cold weather. This type of pipeline would be extremely expensive to construct. The number of pipelines would be high to separate the transportation of various types of products. Direct delivery by barge is the most economical method of transporting petroleum products to outlets on the Connecticut River.

## 2.2 Old Saybrook Area

Old Saybrook is located in Middlesex County in south central Connecticut, at the mouth of the Connecticut River. It is bounded on the west by the Town of Westbrook, on the north by Essex, and on the east by the Connecticut River. Old Lyme lies to the east across the river, and the town is bordered by Long Island Sound to the south.

As with most communities bordering Long Island Sound, Old Saybrook has experienced steady growth in recent decades. The population was 2,499 in 1950; 5,247 in 1960; and 8,468 in 1970. Current population is over 9,000 (State of Connecticut, 1973). Old Saybrook is 42 miles south of Hartford, Connecticut; 110 miles east of New York City, and 115 miles southwest of Boston, Massachusetts. Other major metropolitan areas within 100 miles include Bridgeport and New Haven, Connecticut, Springfield and Worcester, Massachusetts and Providence, Rhode Island.



Old Saybrook is an important resort community. Approximately one-third of the dwellings are seasonal, and many are available for short term or summer rental. Access to the water and the beach and ocean environment make aquatic recreation an important feature. Yachting is a favorite activity (Old Saybrook Chamber of Commerce, 1973).

Industrial development of the shore areas has been kept to a minimum, although the town does welcome new sources of jobs and products. The area is serviced by rail, airplanes and highway. Retail and service establishments have increased with population; however,, the town is not highly commercialized. Industry is represented by approximately 40 establishments that cover a wide range of products and services, including boat building and repairs; commercial printing; furniture; electronic equipment; plastics and timing devices (Old Saybrook Chamber of Commerce, 1973).

### 2.3 North Cove

Description - North Cove is a shallow embayment near the mouth of the Connecticut River at Old Saybrook. Surface area of the cove is approximately 150 acres.

The area around North Cove is particularly scenic. The cove is bounded on the north side by an artificial fill that separates the Cove from an extensive salt marsh and tidal pond. To the west and south, the land area is divided into estates and small family

dwellings. The homes are well cared for, as are the land properties surrounding the Cove. The public boat ramp (south shore) is also in good repair. The Cove and numerous sail and motor craft provide high aesthetic value from all points. Several of the nearby homes are also very old, and can be considered valuable historical resources in Old Saybrook. Water aesthetics are good considering the sheltered nature of the Cove.

As previously stated, shoaling has reduced water depths at mean low water to 4.2 feet in the entrance channel, 4.5 feet in the 11-foot anchorage and 5.2 feet in the 6-foot anchorage. Statistics of applications for mooring space in North Cove since 1972 show that an average of about 55% of the vessels involved have drafts exceeding four feet (Study of Connecticut River Below Hartford, North Cove, Old Saybrook, Connecticut, 1974; and personal communication, Dr. Mauriac, 1976). The number of applications received for each year since 1972 has exceeded the number of vessels which can be accommodated (about 150). Failure to implement the proposed project will perpetuate unsafe navigation conditions for vessels using the Cove and, combined with continued shoaling, will lead to the project's becoming inadequate for most of the vessels now using it.

Fish and Shellfish Resources - Prior to 1965, only eels were reported to inhabit the North Cove. Today, many fish are being caught in the Cove. These include bluefish, striped bass, weakfish and menhaden, all of which have significant economic and recreational value. Perch and catfish have also entered the Cove. Eel are now

caught in approximately the same numbers as before the original dredging in 1965 (Squires, August 8, 1975). It follows that these species, plus shad during the spawning seasons, inhabit various sections of the Connecticut River.

Bottom dwelling invertebrates, in particular crabs, have been reported in the Cove in increasing numbers (Squires, August 8, 1975). The increase in crab and fish populations indicate a probable increase in benthic micro- and macro-invertebrates, and other marine organisms. since these are food sources for higher forms of vertebrates.

Water Quality - Water quality in North Cove has been designated Class SCc which is suitable for fish, shellfish, and wildlife, recreational boating and industrial cooling. It has good aesthetic quality. Bacteria such as coliform are present in North Cove. The 1975 Bathing Beach Study (Conn. State Department of Health) shows that no coliform organisms are present in sufficient quantities to classify the Cove water as good to fair (70-400 organisms/100 ml). The entire Connecticut River mouth is classified as fair, with an average coliform count of 353 organisms/100 ml.

#### 2.4 Long Island Sound

Long Island Sound lies between 40° 50' N and 41° 20' N latitude and 72° W and 73° 31' W longitude, and is a semi-enclosed system between Long Island, New York and Connecticut. The western end is contiguous with New York Harbor, while Fisher's Island delimits the eastern end from Block Island Sound. The Sound is about 90 nautical miles long, has a maximum width of 15 miles, and an area of 928

square nautical miles (Riley, 1955). The greatest depths, 325 feet, (100 meters) are found in the eastern end, and decrease to depths of 108 feet (35 meters) in the central and western portions of the Sound. Mean water depth is 62 feet (20 meters).

The Sound experiences the same semi-diurnal cycle as does the Connecticut River estuary. Tidal amplitude ranges from a maximum of 2.5 feet (0.8m) in the area of the eastern end to 7.3 feet (2.3m) at the western end (ESSA, 1974). Depths at the disposal site range from 160 to 172 feet at mean low water.

## 2.5 Analyses of Bottom Sediments

EPA 1975 Guidelines (Federal Register, Vol. 40, NO. 173 - Friday, 5 September 1975) offer guidance on general approaches for technical evaluation of ecological effects from dredged material discharges. The Guidelines state: "No single Test or approach can be applied in all cases to evaluate the effects of proposed discharges of dredged or fill material. Evaluation of the significance of physical effects often may be made without laboratory tests by examining the character of the dredged or fill material proposed for discharge..."

Sediment samples obtained from the Connecticut River, by the Corps of Engineers, in September and March 1974 showed that the material is predominantly medium to fine sand at Essex Shoal and fine sand at Brockway Bar. The material is classified as unpolluted according to Environmental Protection Agency criteria. Grain size analyses of sediment from Essex Shoal and Brockway Bar are contained in Appendix A.

The Corps of Engineers has conducted both sedimentological (April, 1975) and standard elutriate (January, 1975) tests on sediments found in North Cove. Data are summarized in Tables 1 and 2.

Sediment analysis (Table 1) indicates that the sediment in North Cove is composed of silty-fine sand or silt, organic debris, and shell fragments. Sediments within the anchorage area are basically organic silts grading to organic silty fine sands in the entrance channel. Average median grain size is 0.037 mm. These sediments are not characteristic of a high water energy system. Reducing conditions (anerobic) exist in North Cove as indicated by the visual analysis of sediment cores by the Army Corps of Engineers, NED, (1975). Also noted was the presence of a strong "marine" odor characteristic of reducing conditions.

A standard elutriate test was performed on sediments found at North Cove and water sampled from the Cornfield Shoals Dumping Ground.

## 2.6 Disposal Site

The proposed disposal site is in an extension of the Cornfield Shoal Dumping Grounds is an area one nautical mile square (with sides running true north-south and east-west), the center is 5,930 yards from Saybrook Breakwater Light on a bearing of 198° 15' true. The specific dumping point within this area is located at 41° 12.6' N, 72° 21.6' W or 6,650 yards from Saybrook Breakwater Light on a bearing of 194° true from the Light.

Acoustic sub-bottom profiles have been made of this area by Yale University (Bokuniewicz, personal communication). While there

TABLE 1.

## Sediment Analysis

North Cove, Old Saybrook, Connecticut

Parameter	Sampling Stations			Mean
	PE-1	PE-2	PE-3	
Visual Classification	Black Organic Silt	Black Organic Silty Fine Sand and Sandy Silt	Black Organic Silt	
Median Grain Size (mm)	0.0150	0.0800 (0.0430)	0.0160	0.037 (0.043)
Vol Solids - EPA %	8.0 (8.8)	4.1 (6.2)	8.8 (12.3)	6.97 (9.1)
Vol Solids - NED %	6.5	2.6	7.0	5.37
C.O.D. %	11.0	5.45	11.9	9.45
T.K.N. %	0.278	0.119	0.350	0.249
Oil and Grease %	0.351	0.254	0.335	0.313
Mercury $\times 10^{-5}$ %	3.9 (5.8)	1.8 (4.3)	4.4 (4.3)	3.37 (4.80)
Lead $\times 10^{-3}$ %	9.8 (9.7)	7.5 (7.7)	7.2 (10.6)	8.17 (9.33)
Zinc $\times 10^{-3}$ %	24.6 (24.8)	12.9 (20.3)	27.0 (25.9)	21.5 (23.67)
Arsenic $\times 10^{-3}$ %	0.73 (0.65)	0.35 (0.38)	0.60 (0.68)	0.56 (0.57)
Cadmium $\times 10^{-3}$ %	0.87 (0.77)	0.42 (0.61)	0.60 (0.59)	0.63 0.66
Chromium $\times 10^{-3}$ %	8.7 (9.7)	4.6 (6.9)	9.6 (10.6)	7.63 (9.06)

(Continued on Next Page)

TABLE 1. (Continued)

Parameter	Sampling Stations			Mean
	PE-1	PE-2	PE-3	
Copper $\times 10^{-3}$ %	14.2 (12.6)	5.8 (7.6)	10.8 (10.6)	10.27 (10.27)
Nickel $\times 10^{-3}$ %	6.5 (5.8)	4.2 (3.8)	7.2 (5.9)	5.97 (5.17)
Vanadium $\times 10^{-3}$ %	5.4 (4.8)	4.2 (3.8)	6.0 (5.9)	5.20 (4.83)
Total Carbon %	3.50	1.56	3.55	2.87

Notes: Values shown are percent of samples dry weight. Concentrations in Parentheses are derived from 1.17 ft. depth of core.

TABLE 2.

New England Division, Corps of Engineers, U. S. Army.  
 Report of The New England Division Materials Testing Laboratory, Water and  
 Sediment Testing. Standard Elutriate Test. North Cove, Old Saybrook, Conn.  
 and Cornfield Shoals Dumping Grounds. January, 1975.

Test Property (2) (3)	Water At Dumping Ground (EW-1)	Standard Elutriate Designation and Depths of Sediment Used in Shake Test (1).					
		North Cove (PE-1)		North Cove (PE-2)		North Cove (PE-3)	
Depth of Sample	-136.0'	0-2"	12-14"	0-2"	12-14"	0-2"	12-14"
Nitrite (N), mg/l	< 0.010	0.012	< 0.010	0.010	0.011	< 0.010	< 0.010
Nitrate (N), mg/l	0.14	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sulphate (SO <sub>4</sub> ), mg/l	1,400	1,200	1,200	1,150	1,125	1,175	1,050
Orthophosphate (P), mg/l	0.045	< 0.010	< 0.010	< 0.010	< 0.010	0.020	< 0.010
Total Phosphate (P), mg/l	0.050	0.095	0.117	0.105	0.047	0.097	0.155
Freon Soluble, mg/l	1.7	4.0	0.0	3.6	3.8	10.8	0.0
Mercury (Hg), µg/l	0.3	0.0	0.0	0.1	0.1	0.1	0.1
Lead (Pb), µg/l	< 4	< 4	< 4	4	< 4	< 4	< 4
Zinc (Zn), µg/l	26.0	17.5	18.5	20.0	12.5	11.0	9.5
Arsenic (As), µg/l	3	11	9	9	11	9	11
Cadmium (Cd), µg/l	3.5	1.0	< 1.0	5.0	1.0	1.0	< 1.0
Chromium (Cr), µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Copper (Cu), µg/l	13	10	10	15	8	15	10
Nickel (Ni), µg/l	14	14	17	20	23	17	8
Vanadium (V), µg/l	< 8	< 8	< 8	< 8	< 8	< 8	< 8
Visual Analysis	-	Dark gray organic silt (OL) with marine odor.		Dark gray organic silty- fine sand (SM) w/marine odor.		Dark gray organic silt (OL) with marine odor.	



TABLE 2. (Continued)

Results of Tests Performed on (1) Standard Elutriate Resulting from the "Shake" Test Using 1 Part Bottom Sediment from Various Sampling Locations with 4 Parts Water from Dumping Ground, and (2) the Virgin Water.

- Notes: (1) Elutriant Designations PE-1, etc. Correspond to Location of Sediment Samples with Exploration No. Shown on Sheet.
- (2) All Tests Performed by NED Laboratory Personnel in Accordance with Current Accepted EPA Procedures.
- (3) Reference is Made to Paragraph 227.61(c), Federal Register, Dated October 15, 1973, Volume 38, No. 198, Part II, EPA, Ocean Dumping, Final Regulations and Criteria which States: "Dredged Material May be Classified as Unpolluted if it Produces a Standard Elutriant in Which the Concentration of No Major Constituent is More Than 1.5 Times the Concentration of the Same Constituent in Water from the Proposed Disposal Site Used for Testing."

are no sediment analyses of the specific point in question, the bottom is in a region of silty sand which extends westerly south of Long Sand Shoal. This indicates the area is relatively inactive in terms of benthic life and current velocities. Sand is not a good habitat for most benthic organisms and silty sand would be washed away by strong currents.

It is assumed that nearly all of the approximately 100 finfish species known to inhabit Long Island Sound can be found in the general area. Therefore many of these species would be found at the disposal site. The specific disposal point is south of significant shellfishing and lobstering activity. Although there may be shellfish and lobster in the general area, the depth of the disposal site precludes concerted fishing activity for these species.

The area is considered a desirable location for long-term disposal of material dredged from areas along the Connecticut shoreline between Black Point west of Niantic Bay and Hammonasset Point west of Clinton Harbor. Available information indicates that disposal operations here would present the least interference with the biological community and with other activities of man. The Environmental Protection Agency has expressed the opinion that the number of dredged material sites should be held to a minimum until sufficient information exists to adequately assess the impacts from this activity. No more detailed information exists for choosing a better alternative site to conform with that objective.

## 2.7 Summary

The proposed dredging project areas are located in North Cove in the Town of Old Saybrook, Connecticut, and in two sections of the mainstem of the Connecticut River. The Connecticut River is a valuable natural resource. The Old Saybrook area is a region of historical, cultural and recreational value. The proposed project also includes the previously described point in Long Island Sound as a disposal site.

Much recreational activity in the area centers on the aquatic environment. Boating and yachting are important activities, and contribute to the recreational and economic resources of the Old Saybrook area. Safe navigation in North Cove and the Connecticut River is important to the economic, recreational and aesthetic resources of the region.

### 3.0 RELATIONSHIP OF PROPOSED ACTION TO LAND USE PLANS

Land areas adjacent to the proposed project areas have already been dedicated to water related activities, such as recreational boating and waterborne commerce. Maintenance dredging is in keeping with these activities and will serve to preserve them.

The activities of recreational vessels in North Cove and commercial vessels in the Connecticut River are of major significance. If the present level of economic and recreational activity resulting from boat moorings in North Cove is to be maintained, it is necessary that adequate depths in the Cove entrance channel and anchorage be maintained. Maintaining the Connecticut River channel to authorized dimensions will help to insure that the regional economy based on waterborne commercial traffic is maintained, and this will help to eliminate delays and potential hazards being experienced by commercial navigation.

The Old Saybrook area is a valuable cultural and historical resource. Preservation of the general area for recreation, scenic, and cultural resources is recommended in recent reports (NERBC, 1973, 1974). The proposed project, in providing for the continuation of recreational potential of the area, is consistent with the broad objectives of such plans. Inasmuch as disposal will be in open water, the project does not relate to the use of land as disposal sites.

#### 4.0 THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

Environmental impacts associated with the proposed project are divided into those impacts related to dredging and those related to disposal of the dredged materials. These impacts may be subdivided into physical, chemical, and biological aspects at each site. The proposed project also will have impact on socio-economic conditions in the area and on the aesthetics at each site.

##### 4.1 Dredging Operations

Dredging will remove and alter the substrate used by various estuarine biota. The area most affected will be that covered by the path of the clamshell dredge. In North Cove this amounts to approximately 20 acres or about 13% of the entire Cove, and 3 acres outside the Cove entrance. Brockway Bar constitutes an area of approximately 7 acres, and Essex Shoal an area of approximately 11 acres. Areas outside the dredge path will be affected somewhat by the suspension and deposition of dredged materials during dredging operations. Dredging operations will probably introduce materials of similar, fine grained composition into the rest of the river estuary and Long Island Sound. Prevailing winds and water current patterns as well as tidal cycles are factors in determining the extent to which suspended matter and high turbidity levels of natural origin will travel, and the duration of such phenomena; they will likewise influence suspended matter generated by dredging. In general, increase in suspended materials from the dredging will be of short duration and is not considered likely to

impact areas away from the actual work sites more significantly than levels of suspended material generated by natural forces during high runoff periods. Thus, the impact of dredging operations on water quality in North Cove as well as the Connecticut River is expected to be minimal.

A review of results from recent research efforts concerned with the release of heavy metals and potentially toxic compounds, during dredging and disposal operations leads to the conclusion that the potential for such releases, and thus for subsequent environmental damage, is slight.

The most obvious effect on biological communities will be the physical destruction of those communities in the path of the dredge. As the benthic (bottom) habitat is destroyed, organisms will be either destroyed or redistributed. The extent of this impact will depend on the mobility, nutritional characteristics, diversity, and productivity of the biota in the area in which dredging and settling occurs. (McCauley et al. 1976). Maximum impact will be localized in the areas to be dredged. By the time the water reaches the Sound, the sediment load should not exceed that normally experienced at times of peak suspended matter.

The release of particulates, potentially toxic compounds, and nutrients can have both detrimental and beneficial effects on phytoplankton. Increased amounts of suspended matter will temporarily increase turbidity, and thus decrease light penetration into the water column. Phytoplankton depend physiologically on light and suspended nutrients to manufacture organic compound. Variations in light from

normal levels can affect photosynthesis, productivity, diversity, density and community structure of phytoplankton. Nutrient release, on the other hand, can cause temporary phytoplankton "blooms" which may eventually result in deteriorating water quality. The zooplankton community composition and density would be expected to parallel that of the phytoplankton since zooplankton consume densities of phytoplankton and zooplankton in areas immediately adjacent to the dredge path. Although such a release is not probable (Lee et al., 1975, Chen et al., 1976). Further, the small planktonic organisms have rapid reproductive capacities, and any reductions in their population would not be a long term impact.

The proposed dredging is not expected to produce any short or long-term deterioration in the aesthetic quality of North Cove, Brockway Bar or Essex Shoal. These areas have been dredged previously without any deleterious effects noted.

#### 4.2 Disposal Operations

Disposal of the dredged sediments will produce several impacts, centering on the effects of sediment deposition and the accompanying rise in turbidity in the water column.

The degree of impact suspended matter has at the disposal site depends largely on the length of time the material is in suspension after being discharged into the water. Hollman et al., 1975, determined that turbidity caused by dumping is a short-term event, and a return of turbidity levels to near ambient conditions are observed shortly after dumping. Gordon, in a study of the New Haven Dumping Ground

Heavy metals released to the water column is considered a relatively short-term event (Lee et al., 1975, Chen et al., 1976). Soderberg,

Bruno, 1971, concluded that "mercury concentrations in fresh surface waters, dissolved or suspended, are rapidly reduced due to sorption and by complexing reactions with clays, plankton, colloidal proteins, humic materials and other organic and inorganic colloids." Although the chemical properties of heavy metals in seawater are not necessarily the same, it is expected that similar chemical phenomena will aid in reducing concentrations of heavy metals within the water column with time, again reducing remote and cumulative impacts. Results of laboratory investigations conducted at the University of Southern California by Chen (1976) produced the conclusion that "concerns regarding the release of any significant quantity of toxic materials into solution during dredging operations and disposal are mostly unfounded." Further, the overall conclusion of the chemical oceanographic monitoring of the Navy's disposal of 1.5 million cubic yards of material at New London is, "no major changes attributable to dumping has yet been detected in the water or sediments,"

No site specific information is available on the extent and diversity of benthic life at the disposal site. Deposition of sediments on the benthic substratum will result in destruction of various benthic biota in the immediate area of disposal operations. Benthic invertebrates adapted to burrowing may migrate vertically to the surface, while other may not survive. Smaller, less mobile infaunal forms and surface dwelling invertebrate species may also be destroyed.



Long Island Sound concludes that "99% of non-cohesive spoil of high silt content discharged from a scow in the presence of a tidal stream is transported to the bottom as a high speed turbulent jet." Gordon's study indicated that the material does not fall as individual particles but is carried very rapidly to the bottom as a 'density current.' This implies that the environmental impacts associated with the discharge of dredge materials should be minimized by the limited contact time available to pollutants traversing the water column. The relatively low energy level believed to exist at the disposal site should limit the extent and severity of remote impacts following disposal. Single dump events can be expected to produce small impacts as their turbidity plumes leave the site and disperse; these impacts, as shown by monitoring efforts in connection with Navy disposal operations at the New London Disposal Area, are short-lived and not severe.

Studies conducted in Elliott Bay, Washington demonstrated that the initial surge of material leaving the barge settles from the water column very quickly, becoming undetectable within 10 minutes after disposal and that a very small amount of material is placed in suspension at the water surface aside from minor surface turbidity the effects of disposal were detected only within 25 meters of the bottom. This material remained in suspension for about 2.5 hours after disposal.

The complex chemistry of suspended particulates, compounds and elements is poorly understood, and is peculiar to each set of circumstances. The potential does exist for degradation of water quality and bottom sediments at the disposal site owing to the introduction of North Cove sediments. In light of recent research, this potential is considered to be remote.

The finfish community in the area and other mobile species such as crabs and lobsters will be able to avoid burial by sediments.

The physical aspects of disposal operations (e.g., siltation and temporary high turbidity) may interfere with the respiration of marine organisms (Saila et al., 1971). Attached benthic forms may suffocate, while respiratory damage may occur in mobile forms. It is generally accepted that fish can withstand high concentrations of suspended sediments for short periods without critical effects. A recent laboratory study (New England Aquarium, 1974) indicated that the effects of turbidity may be sub-lethal for certain benthic forms. As previously indicated, high levels of turbidity from disposal operations are of short duration. Bocuniewicz et al., (1974) found that the turbidity "cloud" settles rapidly after disposal, and that 26 minutes after disposal the turbidity in the water column approaches pre-disposal levels.

Aesthetics in the disposal area may be temporarily degraded by the increased amounts of suspended particles in the water column. This impact will be short-term, and should not vary significantly from the normally high sediment load of Long Island Sound waters.

Temporarily high concentrations of suspended particles decrease light penetration into the water column and produce a drop in the photosynthetic rate of phytoplankton. This is expected to be a short-term event.

Commercial fishing in the immediate area affected by disposal operations is not known to be a relatively significant activity. In any case, lobsters, crabs, shellfish and finfish are expected to survive

temporary conditions of high turbidity. Populations should return to normal densities shortly after cessation of disposal operations.

#### 4.3 Impacts of Project Itself

Impacts identified above center around shorter term effects related to the physical activities of dredging and disposal. It is equally important to identify effects of the project on the human environment.

Continued availability of North Cove to small craft for recreational activities will result from the proposed project. Adequate depth of the channel and anchorage areas will permit continued use of the Cove as a safe port. It is the nearest protected anchorage to Long Island Sound in the Connecticut River. Utilization of the recreational potential of the area will be maintained by the project. Economic benefits to the Town of Old Saybrook resulting from the use of the North Cove anchorage are recognized by the Old Saybrook Economic Development Commission. (Letter dated March 30, 1976).

Another significant impact of the proposed project is maintenance of navigation in the Connecticut River. Dredging of Brockway Bar and Essex Shoal will maintain those portions of the Connecticut River navigation channel to authorized dimensions, thereby promoting the safe and efficient passage of commercial traffic. Continued use of the river by ships and barges will have the well-recognized advantages in costs and energy utilization per ton-mile for water transport in contrast with land transport.

Although these impacts may be measured in years, shoaling will continue after the proposed project is completed. Thus, the project is

viewed as one step in a long-term (many decades) maintenance program for navigation in the Connecticut River system.

#### 4.4 Cumulative Dredging Impact

It is anticipated that other dredging projects will be performed over the next 10 years in the vicinity of the proposed work. These projects, while not within the scope of the proposed work, are related environmentally in that they are expected to entail disposal at the site selected for the work at hand. The assumption is that this site will prove to be viable as a regional disposal point. The projects, which are expected to generate approximately 1.7 million cubic yards of material by 1986, are summarized below.

##### Federal Dredging Projects

Connecticut River Below Hartford - Frequency of required maintenance dredging in this project is impossible to forecast due to the variability of shoaling. However, based on prior dredging, it may be anticipated that a total of 250,000 cubic yards of granular material will be dredged over the next 10 years from the five lower bar channels (Saybrook Outer Bar, Saybrook Shoal, Calves Island Bar, Essex Shoal and Brockway Bar). Land-based disposal sites are either non-existent or essentially used to their full capacity. Land-based disposal sites for some of the remaining 28 river bar channels are difficult to obtain, but it is assumed that suitable land sites will be available over the next 10 years.

North Cove, Old Saybrook - A study is under way to evaluate the feasibility of expanding the existing anchorage by approximately 29

acres. No conclusion has been made. If authorized and funded, the work would involve removing and disposing of approximately 300,000 cubic yards of material, primarily sand; the projected time is about 1981.

Projected maintenance dredging at North Cove, assuming that the new work is performed, consists of 100,000 cubic yards in 1981. It is anticipated that the material will be similar to that involved in the present proposed project.

Duck Island Harbor - Projected maintenance dredging consists of 150,000 cubic yards in 1982. Character of material at this project is unknown.

Patchogue River, Westbrook - A study is under way to evaluate the feasibility of widening the existing 75-foot wide entrance channel to 150 feet. If authorized and funded the work would involve removing about 40,000 cubic yards of material, primarily sand, around 1980.

Projected maintenance dredging of this project consists of removing and disposing of about 50,000 cubic yards (25,000 cubic yards in 1981 and 1985) of sand and silt over the next 10 years. Although land disposal areas are currently available, it is assumed that they will be filled to capacity in the near future.

Clinton Harbor, Clinton - A study is under way to evaluate the feasibility of widening and lengthening the existing channel. If authorized and funded the work would involve the removing and disposing of approximately 200,000 cubic yards of material, consisting of both sand and organic matter; timing would be around 1980.

Projected maintenance dredging of this project consists of removing and disposing of 125,000 cubic yards of material, consisting of sand and organic matter, in 1980.

#### Private Dredging Actions

A permit has been issued to the Northeast Nuclear Energy Company to dredge about 40,000 cubic yards of sand from Niantic Bay and Long Island Sound. The permit provides for placing this material in the Cornfield Shoal Dumping Grounds, probably in 1976. It is likely that the disposal operation will be shifted to the point being considered in this Assessment.

There is a pending permit application on file from the Pilots Point Marina of Westbrook, Connecticut to remove and dispose of approximately 12,000 cubic yards of organic mud from the Patchogue River. The new disposal area will be proposed for this project if a permit is granted. The work would likely be performed in 1977.

In the absence of specific permit requests, it is not possible to forecast future requirements for private dredging other than to project dredging volume requirements based on previous experience. This is admittedly an imprecise approach, but it does allow a contingency for private dredging activity. Past records of permit applications involving material dredged from the area between Black Point and Hammonasset Point and disposal of in open water indicate that a total of 400,000 cubic yards is likely to be involved in similar permit requests over the next ten years. Assuming that permits are granted and the new disposal area proves to be viable for continued use, this new area would be used

for disposal of the material. It is not possible to predict the exact nature of the material that will be involved.

Because of substantial variations in the nature and volume of material involved in projected dredging and disposal operations, both Federal and private, it is not possible to predict impacts with any precision. In general, future projects are expected to have impacts similar to those of the proposed dredging; this work involves materials which span most of the spectrum, as regards contaminant concentrations and physical characteristics, of materials which may be involved in future disposal operations. Because potential future work involves materials which are expected to vary from essentially clean sands to organic silts, "clean" materials will serve to provide successive "caps" over the more contaminated material. The variability of dredging requirements and availability of funds, both public and private, precludes establishing a definite regimen to that end, but there is a high probability that materials of different characteristics will be alternated to a considerable degree at the disposal site.

#### 4.5 Scientific Studies of the Disposal Site and Disposal Effects

This Assessment contains references to a number of reports of investigations into dredged material disposal phenomena. There is a continuing interest in this area of science, particularly by concerned Federal and State agencies and in the universities whose research programs have been supported to a large degree by State and Federal grants. It is conceded that a great deal of scientific research remains to be done. The Corps relies on this continuing research as part of the

quest for scientific knowledge and is prepared to change its outlook on dredged material disposal when such change is dictated by scientific inquiry. The consistent return from such studies thus far does not justify adopting a new outlook, but does mandate a continued investigation and surveillance of disposal activities.

Owing to the need for further knowledge on the effects of dredged material disposal, the proposed work includes provisions for studies of the disposal site and its environs before, during and after disposal operations. The proposed studies are comprised of the following elements:

- Additional sampling and analysis of North Cove sediments.

- Sampling and analysis of sediment from the disposal site.

- Detailed bathymetric surveys of the disposal site both before and after disposal operations.

- Measuring and recording dispersal characteristics of the material during disposal. This will involve recording the velocity and acceleration of the head of the density current, lateral spreading of the descending jet, velocity and thickness of the bottom surge, and distribution of residual material in the water column.

The study will be conducted by the Corps of Engineers Waterways Experiment Station with participation by Yale University, as part of the Dredged Material Research Program.



#### 4.6 Summary of Impacts

Impacts of the proposed project have both short-term and long-term implications. Physical, chemical and biological activities associated with the dredging and disposal operations will have short-term effects on the water column and the benthic community. Longer term effects include the impacts on regional cultural, economic, and recreational resources. The impacts of subsequent dredging operations, while varying in scope on a case-by-case basis, are expected to be similar in nature to those of the proposed work. Table 2 summarizes impacts likely to occur should this project be implemented.

Southwest Ledge Light bears True 345°, distance 10,750 yards, and Townsend Ledge Lighted Gong Buoy 10A bears True 013°, distance 7,400 yards. Depths range from 63 to 72 feet (19 to 22 meters) at mean low water. The New Haven Dumping Ground is approximately 28 nautical miles from the entrance of North Cove.

Studies conducted in conjunction with previous disposal operations have demonstrated that the New Haven Dumping Ground is a containment site. Inasmuch as containment of the material to be disposed of is among the objectives of the proposed project, this appears to be a suitable site from that standpoint. Further, there are no indications that disposal of approximately 900,000 cubic yards of material from New Haven Harbor in 1973 - 4 has resulted in any significant environmental losses. There is no reason, with the information at hand, that the New Haven Dumping Ground could not serve the proposed maintenance dredging project from an environmental point of view. However, the distance of this site from the area to be dredged does present a substantial economic disadvantage for the proposed work and for any future work in the vicinity of the Connecticut River. Given the limits of knowledge concerning the environmental effects of dredged material disposal, our present thinking favors establishment of regional dumping grounds within economic haul distances from areas of concentrated dredging activity.

New London Dumping Grounds - This area is described as one nautical mile square (sides running true north-south and east-west) from the center of which Orient Point Light bears S by E 1/w E (magnetic)

losses of benthic organisms through dredging operations in the Connecticut River will be smaller. Most of the biota and invertebrates found in these areas have high reproductive potentials. As the substrate becomes stable again, recolonization is highly probable.

Disruption of aquatic organisms at the disposal site is anticipated. Although most mobile organisms will be able to leave the area or themselves out of the sediment, sedentary biota will be lost. However, biota directly affected by the project are a very small fraction of the marine ecosystem involved; direct and indirect effects of disposal are expected to cover a relatively confined area. Recolonization by resident species can be expected.

### 5.3 Aesthetics

As dredging operations proceed, the water column will probably appear turbid. This is likely to be most significant in North Cove. As stated before, the larger particles which cause the appearance of dirty or turbid water will settle out relatively quickly.

Nutrients dredged up will tend to increase primary productivity by phytoplankton, which in turn may change the appearance of the water. However, such changes are difficult to predict. A definite aesthetic impact from enhanced phytoplankton growth is not necessarily a probable event, although it is certainly possible.

## 6.0 Alternatives to the Proposed Action

Alternatives to the proposed maintenance dredging of the Essex Shoal and Brockway Bar in the Connecticut River Below Hartford can be categorized into three groups, relating to the method of dredged material disposal, the method of dredging, and the no-action alternative. Given the characteristics and quantities of sediments involved, the state of knowledge concerning environmental impacts of dredging, and site-specific constraints, it is believed that the project as proposed is the most feasible and at the same time environmentally acceptable of the options considered. The following sections discuss alternatives to the proposed project in greater detail.

### 6.1 Dredging

Frequency and Degree - The frequency of dredging in Essex Shoal and Brockway Bar is variable due to freshwater flow and accompanying sediment input from upland sources. Unusually severe storms accompanied by high runoff, can necessitate emergency dredging action. Because North Cove is a relatively new project which has not been maintained previously, no reliable dredging frequency has been established.

The proposed dredging will maintain Essex Shoal and Brockway Bar to authorized dimensions and North Cove to the dimensions indicated earlier. Knowledge of channel usage by commercial and recreational boating interests supports the need for the proposed project.

Method of Dredging - Maintenance dredging will be accomplished with a clamshell or bucket dredge and utilize scows for transporting material to the Cornfield Shoal disposal site in Long Island Sound. Environmentally, the clamshell dredge has certain advantages. The density of material removed by a clamshell dredge normally approaches that of the in-place sediments during dredging. Also, only a very small bottom area is disturbed at any one time by the dredge bucket. These two characteristics minimize turbidity associated with the dredging operation.

Timing of Dredging - Dredging is scheduled to be performed between September 1976 and January 1977. In any case, dredging in the Connecticut River will not be performed during the periods 1 April - 30 June and 1 October - 30 November and no dredging will be performed in North Cove from 1 April - 30 June. This is in accordance with restrictions placed on dredging in the river during other maintenance operations.

## 6.2 Disposal

Utilization of Land-Based Sites - Land-based sites for dredged material from Brockway Bar were considered during the early stages of project planning; however, no owners of potentially suitable areas were willing to permit use of their land in this purpose. In the case of Essex Shoal, material dredged recently was placed on Nott Island in the Connecticut River in conjunction with the Waterways Experiment Station's Dredged Material Research Program. Placing

additional material on this site would interfere with its ongoing development as an upland wildlife habitat area. No other suitable land-based site is available.

Land disposal sites were also considered as alternatives for disposal of North Cove material. Four specific sites were considered and were found to be inadequate for various reasons. These sites are shown on Figure 3. Site No. 1 is the present town dump for the Town of Old Saybrook. This dump is scheduled to be closed soon, and Town officials originally thought that the dredged material from North Cove would provide a good cover. The area's height, limited capacity and potential leeching problems precluded further consideration as a suitable disposal site. Site No. 2 is owned by Mr. Lombardi, a citizen of Old Saybrook, and is located adjacent to the corner of the anchorage in the cove. Mr. Lombardi was looking for some fill for approximately two acres of lowland. However, there is insufficient capacity at this site to be helpful. Site No. 3 is an area of approximately 12-15 acres located in Old Saybrook and owned by the State of Connecticut. A central portion of this area has been designated by the State as wetlands. The town has long-range plans to acquire and develop this land as a historical site. The extent of the wetlands makes this site undesirable for dredge disposal. Site No. 4 is located north of the anchorage area on land owned by Mr. Van Epps. This site consists of 10 acres of land. The construction of a dike along the east and south sides adjacent to wetlands would be a required condition for disposal at this site. Such construction would produce a containment

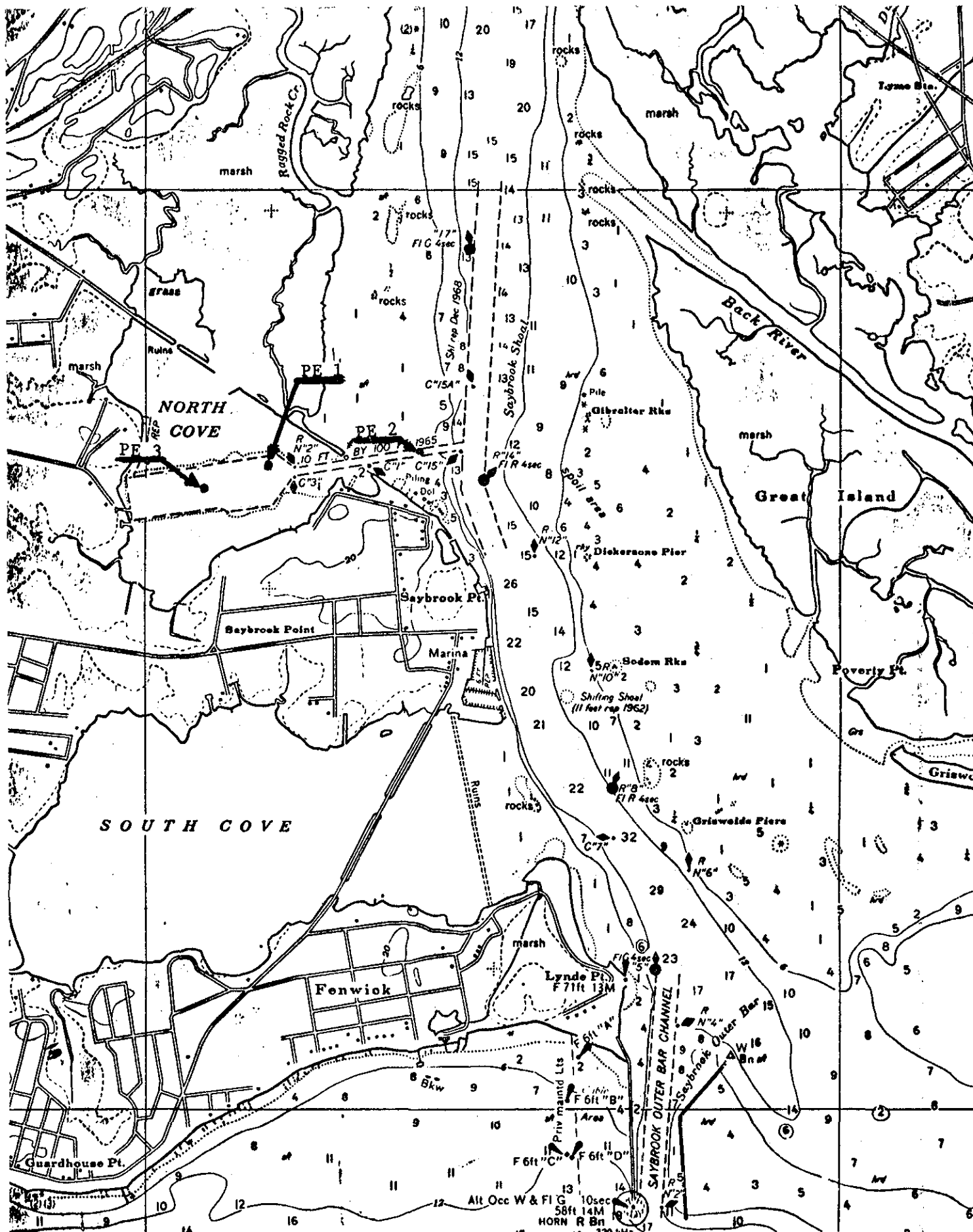


FIGURE 3

area of insufficient capacity to hold the dredged material, precluding further consideration of this site.

Open Water Disposal - Consideration has been given to open water disposal alternatives.

Cornfield Shoal - The charted Cornfield Shoal Dumping Ground is described as an area in Long Island Sound one nautical mile square (sides running true north-south and east-west) from the center of which Saybrook Breakwater Light bears N by E (magnetic) 4,900 yards, and Cornfield Point Lightship bears W 3/8 S (magnetic) 2,875 yards, or a true bearing 179° from Saybrook Breakwater Light.

The proximity of this site to the proposed dredging and the fact that it has been used previously for disposal of material from North Cove during original dredging and from the Connecticut River during maintenance dredging resulted in its being given consideration in the proposed project.

Current measurements taken at the Cornfield Shoal disposal site by R.W. Morton and G.S. Cook (1975) indicate a strong semi-diurnal tidal influence. Current meters, approximately one meter above the bottom, were located in the northwest and southeast corners of the dumping grounds. Average ebb currents were higher than average flood currents at both stations, with generally higher current velocities found at the southeast station. The highest velocity recorded was approximately 2.5 fps at the southeast station. Average current velocities at the southeast station were 2.1 fps (ebb) and 1.8 fps (flood). At the northwest station, average ebb and flood velocities were 1.6 fps and 1.2 fps respectively.



Progressive vector plots of the current readings revealed a net northwesterly drift at the southeast station and a net westerly drift at the northwest meter. Mean velocity (ebb-flood) for the southeast station is 0.37 fps (319°) and 0.32 fps (285°) for the northwest station.

Based upon the above, and the fact that sediments at the Cornfield Shoal site are primarily composed of gravel and coarse sands (MACFC Informal Report No. 42, 1974), it appears that this is a dispersal site with Long Sand Shoal acting to modify the strength and direction of dispersal.

The general area in which the Cornfield Shoal site is located is assumed to be inhabited by nearly all of the approximately 100 finfish species known to inhabit Long Island Sound. Commercially important finfish in the area include shad, menhaden, alewife, scaup and flounder. The lobster yield and the intensity of fishing are not available.

Cornfield Shoal has been used previously as a disposal site for clean granular materials totalling slightly more than 1,008,000 cubic yards. No adverse comments have been received as a result of previous disposal operations, and there is no reason to believe that the proposed disposal will have any significant impact upon environment.

New Haven Disposal Site - This site was also considered as an alternative for disposal. This site covers an area two nautical miles long and one nautical mile wide. From the center of the site,

Southwest Ledge Light bears True 345°, distance 10,750 yards, and Townsend Ledge Lighted Gong Buoy 10A bears True 013°, distance 7,400 yards. Depths range from 63 to 72 feet (19 to 22 meters) at mean low water. The New Haven Dumping Ground is approximately 28 nautical miles from the entrance of North Cove.

Studies conducted in conjunction with previous disposal operations have demonstrated that the New Haven Dumping Ground is a containment site. Inasmuch as containment of the material to be disposed of is among the objectives of the proposed project, this appears to be a suitable site from that standpoint. Further, there are no indications that disposal of approximately 900,000 cubic yards of material from New Haven Harbor in 1973 - 4 has resulted in any significant environmental losses. There is no reason, with the information at hand, that the New Haven Dumping Ground could not serve the proposed maintenance dredging project from an environmental point of view. However, the distance of this site from the area to be dredged does present a substantial economic disadvantage for the proposed work and for any future work in the vicinity of the Connecticut River. Given the limits of knowledge concerning the environmental effects of dredged material disposal, our present thinking favors establishment of regional dumping grounds within economic haul distances from areas of concentrated dredging activity.

New London Dumping Grounds - This area is described as one nautical mile square (sides running true north-south and east-west) from the center of which Orient Point Light bears S by E 1/w E (magnetic)

3,350 yards, and Plum Island Light bears SE (magnetic) 3,200 yards; depths range from 63 to 72 feet.

Based on information gained from monitoring at the Navy's disposal operations at the New London Dumping Grounds, it is considered that this is an environmentally acceptable alternative disposal area for the proposed work. However, it is not located so as to serve as a viable disposal area for the region around the Connecticut River estuary. In addition, there is at present a court injunction against present use of the New London Dumping Grounds, eliminating it from further consideration for the proposed disposal operations.

Niantic Dumping Grounds - This site occupies an area one nautical mile square (sides running true north-south and east-west) from the center of which Bartlett Reef Lighted Whistle Buoy 2A bears ESE (magnetic) 4,050 yards, and Bartlett Reef Light bears E (magnetic) 4,300 yards. Depths range from 66 to 94 feet at mean low water.

Sediments at this site consist primarily of sand, with some gravel and clay (Gordon, 1973). NOS charts indicate maximum ebb current velocity of 1.8 knots and a maximum flood current velocity of 1.9 knots. It appears from available data that this is a dispersal site with a net landward transport. It has in the past been used for disposal of approximately 176,000 cubic yards of material, consisting of medium sand, with no known adverse effects noted. The site does not appear to be suitable for long range use in disposing of other than clean granular materials and consequently is not favored for use in the proposed project. Some commercial fishing is conducted in the area of the Niantic site, with

scup being the principal species caught. There are shellfish resources in the Niantic area, and lobstering is done at the dump site. No information is available as to the yield or value of the catch in either case.

Clinton Dumping Grounds - This is an area of one nautical mile square (sides running true north-south and east-west) from the center of which Kelsey Point Breakwater Light bears NNE 1/2 E (magnetic) 3,050 yards and Long Sand Shoal West End Lighted Bell Buoy bears E 3/8 S (magnetic) 5,400 yards. Depths range from 79 to 114 feet at mean low water.

No specific information is available on this site; thus there is little basis for making a case either for or against its use in the proposed project. It is known that the Connecticut Department of Environmental Protection has reservations concerning using this site (letter dated 15 April 1976 from Commissioner Gill). In addition, the site is not so located as to serve as a long-term regional disposal site.

### 6.3 No Action

The Essex Shoal and Brockway Bar channels have shoaled to the point where maintenance is necessary. The work should proceed without undue delay so that the river's value to commercial navigation is not interrupted or diminished. If no action were taken, not only environmental impacts but also beneficial socioeconomic impacts would be foregone. The existing shoals serve to increase the cost

of shipping in the river due to light loading; they also could result in groundings or collisions, thereby increasing the potential for a significant oil spill. Obviously, there are trade-offs involved in balancing these effects. It is believed that the provision of safe and adequate channel dimensions for those who depend on them necessitates the proposed maintenance dredging action.

Selection of the "No Action" alternative was also considered in relation to the long-range implications to the total human environment of the Old Saybrook area. As reviewed in previous sections of this report, Old Saybrook is a historical and recreational resource for the State of Connecticut. Much of the recreational activity is related to the aquatic environment, specifically to boating and yachting. Progressive shoaling in the anchorage and channel areas of North Cove is unfavorable to the full utilization of the recreational potential of the area and threatens the continued availability of one of the few protected anchorage areas in the vicinity. Potential negative effects of the no action alternative include decrease in recreational boating, possible casualties to recreational vessels, and probable decrease in the marine and related industries in the immediate area.

## 7.0 RELATIONSHIPS BETWEEN SHORT-TERM AND LONG-TERM GAINS AND LOSSES

Short-term losses of biota in the relevant aquatic ecosystems, as well as long-term utilization of water resources will result from the proposed project.

Short-term disruptions and losses of biota have been discussed in this report. Living systems can establish new dynamic equilibria and resume productivity after disruptions by natural or man-made events. It is improbable that the actions proposed in this project will cause long-term disruptions in aquatic productivity.

A long-term gain from the proposed project is maintenance of recreational and cultural resources of the Old Saybrook area. Periodic but infrequent maintenance dredging of the anchorages and entrance channel will be required as long as boating usage remains at the present level. This is not expected to effect any long-term disruption of the Old Saybrook area because of major land use changes. The area is recognized as one of cultural, historical, and recreational importance, and it is likely that these resources will be preserved.

Navigational maintenance of the 15' channel in the Connecticut River is necessary to insure the safe and unobstructed passage of oil barges. This oil supplies the energy needs of industry and homeowners alike and is essential to the socio-economic stability of the area. Because of the nature of the dredged material (sand) and scheduling of the maintenance operation, serious effects to the

indigenous river biota or to migrating species such as the shad are not expected. The assumption made is that the economic benefits resulting from the channel maintenance outweigh any possible adverse effects. Maintenance of navigation in the river is thus viewed as a long-term gain in economic productivity.

8.0 ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES  
WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE  
IMPLEMENTED

Implementation of the proposed project will result in the irretrievable commitments of capital, energy and labor.

Although losses of some benthic organisms during dredging and disposal are irretrievable, the effects on the ecosystem are not irreversible; repopulation and recolonization of disturbed areas is known to begin shortly after cessation of the disturbance. Effects on the ecology of the open water disposal site probably represent the longest-lasting impacts discussed in this assessment. However, as in the case of impacts at the dredging sites, recolonization is anticipated.



TABLE 3

## SUMMARY OF POTENTIAL IMPACTS

Time Frame of Impact and Phase of Project	Physical/Chemical Impacts	Biological and Ecological Impacts	Other Environmental Impacts
<b>SHORT TERM</b>  Dredging Operations	<ul style="list-style-type: none"> <li>.Alternation and Removal of Benthic Substrate</li> <li>.Release and Temporary Suspension of Dredged Material in Water Column</li> <li>.Temporary Release of Nutrients</li> <li>.Temporary Release of Potentially Toxic Materials</li> <li>.Temporary Decrease in Light Penetration</li> <li>.Temporary Loss in Water Quality</li> </ul>	<ul style="list-style-type: none"> <li>.Loss of existing Benthic Communities in Dredge Area</li> <li>.Potential Temporary Reduction in Photosynthesis</li> <li>.Potential Temporary Increase in Primary Productivity</li> <li>.Potential Toxic Effects on Biota</li> </ul>	<ul style="list-style-type: none"> <li>.Temporary Reduction in Visual Aesthetic Value of Water Column</li> </ul>
Disposal Operations	<ul style="list-style-type: none"> <li>.Temporary Increase in Turbidity at Disposal Site</li> <li>.Increase of Sediment at Disposal Site</li> <li>.Temporary Decrease in Water Quality</li> <li>.Temporary Introduction of Potentially Toxic Materials in Sediment and Water Column</li> </ul>	<ul style="list-style-type: none"> <li>Burial and Disruption of Benthic Biota</li> <li>.Temporary Disruption of Respiratory Mechanisms</li> <li>Temporary Reduction in Photosynthesis</li> </ul>	<ul style="list-style-type: none"> <li>.Temporary Reduction in Visual Aesthetic Value of Water Column</li> <li>.Temporary, Localized Disruption of Commercial Fishing Near the Disposal Site</li> </ul> <p>(Cont. on Next Page)</p>

TABLE 3 (Continued)  
SUMMARY OF POTENTIAL IMPACTS

Time Frame of Impact and Phase of Project	Physical/Chemical Impacts	Biological and Ecological Impacts	Other Environmental Impacts
<p>SHORT TERM</p> <p>Disposal Operations (Cont.)</p>	<p>.Temporary Reduction in Light Penetration</p>	<p>.Toxic Effects on Biota</p>	
<p>LONG TERM</p>		<p>.Increase in Biological Productivity in North Cove</p>	<p>.Continued Use of North Cove for Recreational Boating</p> <p>.Avoids Need for Future Relocation of Recreational Boats</p> <p>.Revenues from Moorings Will be Maintained</p> <p>.Maintains Navigation of Conn. River With Advantages of Waterborne Transport</p> <p>.Maintains Cultural and Aesthetic Resources of the Area</p>

## 9.0 COORDINATION

The proposed project and specific aspects thereof have been discussed with numerous public agencies, private organizations, and individuals. Many of these groups or individuals offered written reports, letters, and oral communications. A list of the contacts appears in Appendix A.

The proposed project has been the subject of extensive coordination with Federal, State and local agencies. Specifically, written and oral communication has been conducted with the United States Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Connecticut Department of Environmental Protection and the Old Saybrook Waterfront Advisory Commission. Particular effort has been directed toward obtaining information and comments from these agencies regarding the availability and suitability of alternative disposal sites and methods for North Cove, Brockway Bar and Essex Shoal. Consideration of all available options has resulted in the conclusion that point disposal at the site which has been identified in this Assessment is the only viable alternative.

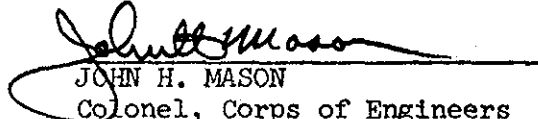
- (1) Advisory Waterfront Commission  
Old Saybrook, Connecticut
- (2) Chamber of Commerce  
Old Saybrook, Connecticut
- (3) Connecticut Department of Agriculture  
Aquaculture Division  
Milford, Connecticut
- (4) Connecticut Department of Commerce  
Hartford, Connecticut
- (5) Connecticut Department of Environmental Protection  
(Conn. DEP)  
Hartford, Connecticut
- (6) Connecticut River Estuary Regional Planning Agency  
Essex, Connecticut
- (7) Connecticut Shellfish Commission  
Hartford, Connecticut
- (8) Connecticut State Department of Health  
Hartford, Connecticut
- (9) National Marine Fisheries Service  
Biological Laboratory  
Milford, Connecticut
- (10) National Marine Fisheries Service  
Middle Atlantic Coastal Fisheries Center  
Sandy Hook Laboratories  
Highlands, New Jersey
- (11) Naval Underwater Systems Center  
New London Laboratory  
New London, Connecticut
- (12) New England River Basins Commission (NERBC)  
Boston, Massachusetts
- (13) New England River Basins Commission (NERBC)  
Long Island Regional Study  
New Haven, Connecticut
- (14) Selectwoman Barbara Maynard  
Old Saybrook, Connecticut
- (15) University of Connecticut  
Marine Sciences Institute  
Avery Point, Connecticut

- (16) University of Connecticut  
Marine Laboratory  
Noank, Connecticut
- (17) U.S. Department of Agriculture  
Soil Conservation Service  
Extension Center  
Haddam, Connecticut
- (18) U.S. Environmental Protection Agency (USEPA)  
Region I  
Boston, Massachusetts
- (19) Yale University  
Dept. of Geology and Geophysics  
New Haven, Connecticut

### CONCLUSIONS

Based on my review of the information within the project's assessment and in consideration of the general public need, I believe the project as described should proceed according to schedule. In my evaluation the assessment prepared in accordance with the National Environmental Policy Act of 1969 is an accurate document revealing that the negative environmental impacts associated with the project are minor. The assessment, therefore, precludes the need for preparation of an environmental impact statement.

4 May 1976  
DATE

  
JOHN H. MASON  
Colonel, Corps of Engineers  
Division Engineer

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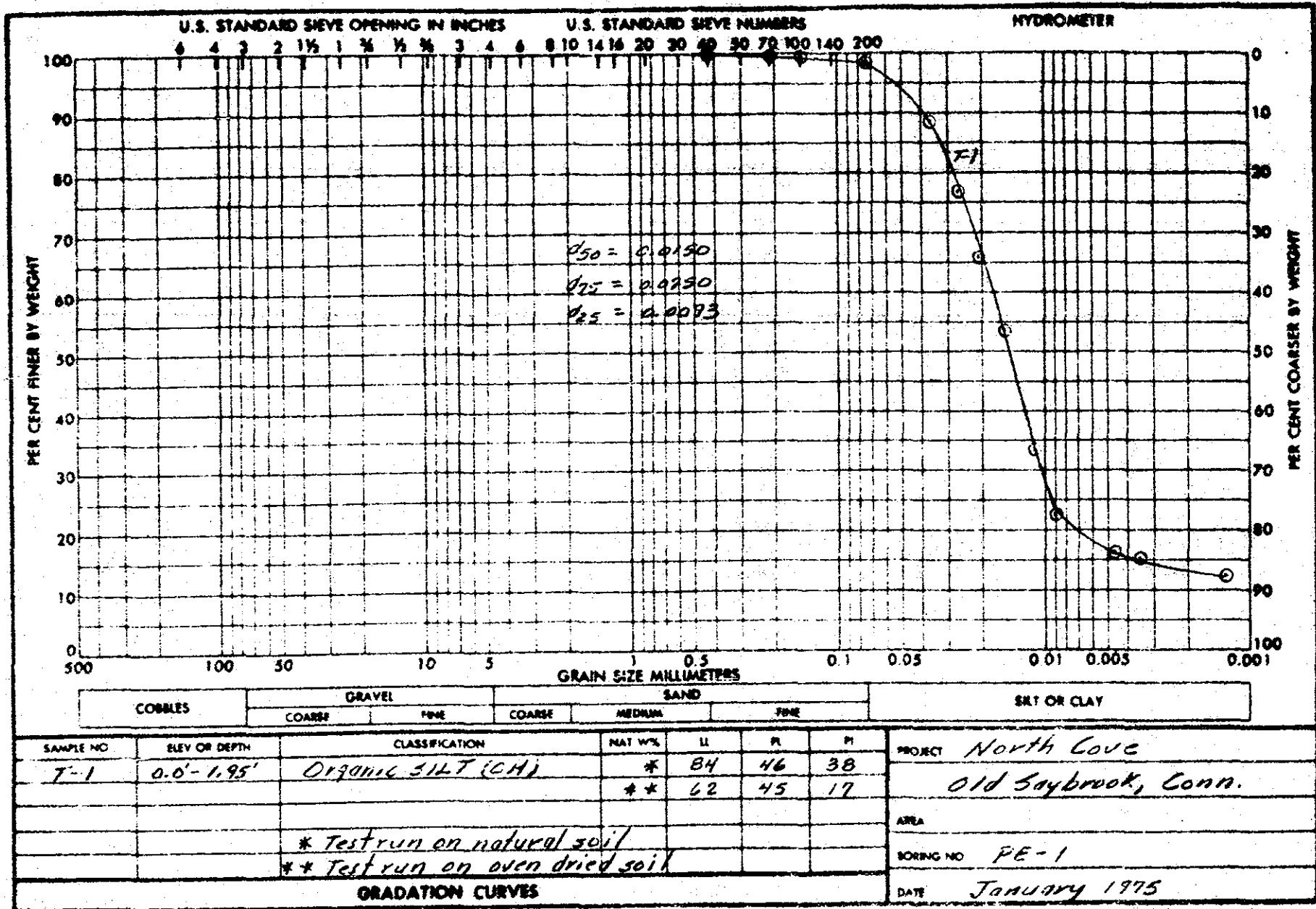
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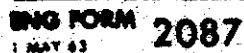


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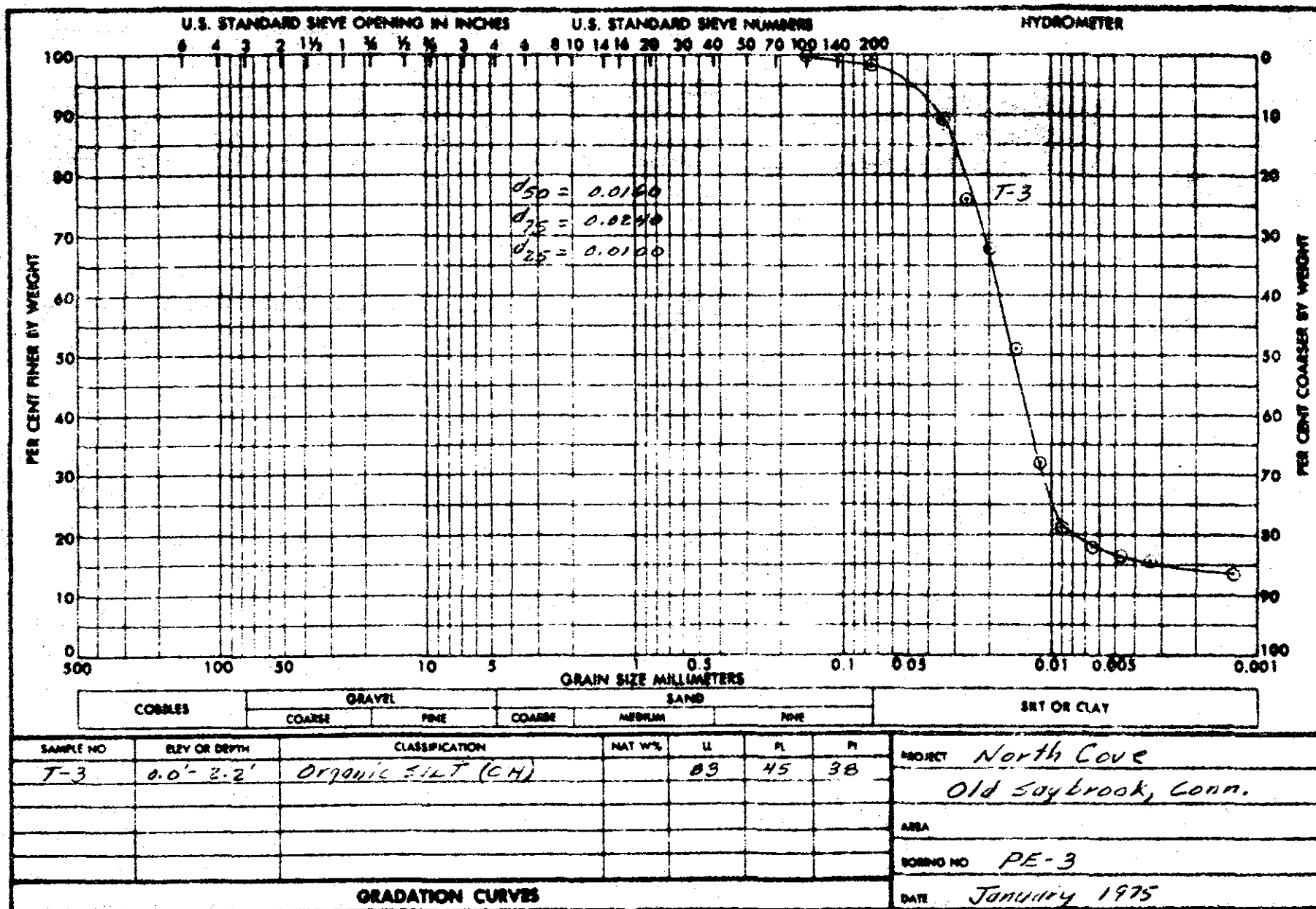
## APPENDIX A





REPLACES WES FORM NO 1241, SEP 1962 WHICH IS OBSOLETE.

U. S. GOVERNMENT PRINTING OFFICE: 1965 OF-729-100



SDO FORM 2087  
1 MAY 63

REPLACES WES FORM NO. 1241, SEP 1962, WHICH IS OBSOLETE.

U.S. GOVERNMENT PRINTING OFFICE: 1966 O-7-700-125

